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APPLICATION NUMBER: *10/706,507*
FILING DATE: *November 11, 2003*
RELATED PCT APPLICATION NUMBER: *PCT/US04/14146*

Certified by

Jon W Dudas

Acting Under Secretary of Commerce
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PTO/SB/05 (08-03)
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17302 U.S.PTO
10/706507
11/11/03

EL973637708US

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	108682-133291
First Inventor	Bushnell
Title	VAPOR FUELED ENGINE
Express Mail Label No.	EL973637708US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

1. ☑ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☑ Applicant claims small entity status.
See 37 CFR 1.27.
3. ☑ Specification [*Total Pages* 12]
(preferred arrangement set forth below)
- Descriptive title of the invention
- Cross Reference to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to sequence listing, a table, or a computer program listing appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings *(if filed)*
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

4. ☑ Drawing(s) (*35 U.S.C. 113*) [*Total Sheets* 4]
5. Oath or Declaration [*Total Sheets* 4]
a. ☑ Newly executed (original or copy)
b. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:
i. ☐ CD-ROM or CD-R (2 copies); or
ii. ☐ Paper
c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
11. ☐ English Translation Document *(if applicable)*
12. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☐ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☐ Other: .....

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: .....

Prior application information: *Examiner* _____ *Art Unit:* _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

☑ Customer Number: 25943 *OR* ☐ Correspondence address below

Name					
Address					
City		*State*		*Zip Code*	
Country		*Telephone*		*Fax*	

Name (Print/Type)	Robert L. Harrington	*Registration No. (Attorney/Agent)*	20,994
Signature		*Date*	11/11/03

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11302 U.S.PTO
10/706507
111103

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 385.00

Complete If Known	
Application Number	not yet assigned
Filing Date	11/11/03
First Named Inventor	Bushnell
Examiner Name	n/a
Art Unit	n/a
Attorney Docket No.	108682-133291

METHOD OF PAYMENT *(check all that apply)*

☑ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: 500393

Deposit Account Name: Schwabe Williamson Wyatt

The Director is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☐ Credit any overpayments

☑ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	385.00
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 385.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below		Fee Paid
Total Claims	8	-20** = 0	X	0	=	0
Independent Claims	1	- 3** = 0	X	0	=	0
Multiple Dependent					=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) -0-

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) -0-

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	Robert L. Harrington	*Registration No. (Attorney/Agent)*	20,994	*Telephone*	503 796 3742
Signature				*Date*	11/11/03

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VAPOR FUELED ENGINE

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108682-133291

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Express Mail Label No. EL973637708US
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VAPOR FUELED ENGINE

Field of the Invention

This invention relates to the use of vaporized fuel to power an engine and, more particularly, to improvements that enhance fuel efficiency.

Background of Invention

It is known that under some conditions the use of vaporized fuel versus liquid fuel for gasoline powered vehicles can reduce the emission of hydrocarbons conveyed into the atmosphere, while also increasing fuel efficiency. The problem that has lingered is how to obtain and retain those benefits over the changing conditions in which such vehicles are typically driven.

Summary of the Invention

As known and as described in the commonly owned US patent application Serial No. 10/002,351, (incorporated herein by reference), fuel efficiency can be improved by heating a quantity of gasoline to cause vaporization, directing the vapor into a stream of ambient air, establishing a desired air-to-fuel mixture and directing the mixture into the intake manifold of an engine.

Whereas the system as disclosed in the above application has resulted in significant improvement, it has not achieved the consistency of operation desired.

It is known that there is an optimum fuel-to-air mixture that needs to be maintained. A fuel-to-air mixture of 1 to 20 is likely too rich resulting in an unacceptable percentage of hydrocarbons in the fuel that are not properly combusted and fuel efficiency is reduced. A 1 to 40 mixture is too lean with today's catalytic converters (CATs) and produces an emission of nitrogen oxide that is prohibited by the EPA emission standards. A fuel-to-air mixture of about 1 to 30 is about optimal for current gasoline engines used in vehicles and an objective of the invention is to control the fuel-to-air mixture to maintain the ratio in the range substantially at, e.g., 1 to 30.

Consistent with the above objective, the mixture is monitored and adjusted throughout operation of the engine. This is accomplished automatically by the use of valves that control the flow of vapor fuel and/or ambient air that is mixed prior to entry of the vapor fuel into the engine's intake manifold. The valves are coupled to a control that is in turn coupled to a vehicle's 0^2 sensor which senses 0^2 emissions in a vehicle's exhaust (a standard feature on most modern vehicles.) It has been learned that the 0^2 emissions are directly related to hydrocarbon emissions which as explained is a reflection of the fuel-to-air mixture.

In the preferred embodiment, an electrical output from the 0^2 sensor is transmitted to the mentioned control. It is known that the desired reading for the voltage output of the sensor as measured by the control is, e.g., 3 volts. At startup, the reading will typically be at, e.g., 4 volts, indicating a too rich mixture but desirable for startup and warming of the engine. After a time delay to accommodate warm up, any reading above or below, e.g., 3, will activate the control for opening and closing the valve or valves which control ambient air flow and vaporized fuel flow (more accurately an enriched mixture of air and fuel). For example, a 3.2 reading will produce an opening of the ambient air valve and/or a closing of the vaporized fuel flow. A 2.8 reading will produce the reverse.

Whereas it would be presumed and has been assumed that an established fixed setting of fuel-to-air mixture would produce a stabilized mixture throughout the operation of the engine, such has been determined to be not the case. There are many variables that need to be controlled or accommodated. The liquid fuel temperature is known to have the greatest impact on hydrocarbon emissions and fuel efficiency, and that temperature will vary by small but very significant degrees of temperature due to environmental changes, i.e., temperature, elevation, humidity, and the like. Thus, in the preferred embodiment, a quantity of fuel to be vaporized is precisely temperature controlled to substantially eliminate the effect of such environmental variables.

Regardless, there still remain significant changes that are not controlled simply by maintaining the liquid fuel temperature. These remaining variables are

accordingly accommodated by monitoring the 0^2 sensors. To the extent that the fuel mixture strays from the desired reading from the 0^2 monitor, the mixture is corrected, i.e., by changing the setting of a valve or valves.

Whereas the above improvements are considered the primary features for the preferred embodiment, the following is also considered to provide additional benefit.

Again in the preferred embodiment, a quantity of liquid fuel, e.g., one gallon of fuel, is inserted into a vaporization tank. The fuel occupies, e.g., the lower half of the tank, and a heating element and temperature sensor is provided in the fuel-containing portion of the tank. The temperature is set and maintained at, e.g., 74 degrees, and that temperature causes vaporization of the fuel, the vapor rising from the liquid surface into the upper half of the tank. Within the tank, in the upper half, there is an ambient air inlet and a vaporized fuel outlet. A sequence of baffles directs air from the inlet and across the surface of the liquid fuel to the outlet which is connected to an outer first conduit. The ambient air temperature is stabilized by its movement over the liquid and in the process mixes with the rising fuel vapor. As expelled through the outlet and into the first conduit, such becomes the vaporized fuel heretofore alluded to and which is perhaps more correctly identified as an enriched fuel air mixture. A secondary source of ambient air is conducted through a second conduit and merges with the vaporized fuel of the first conduit. Prior to said joining of the air and vaporized fuel, at each or a selected one of the first and second conduits, control valves are provided which control the flow volume from the respective conduits to vary the amount of ambient air and vaporized fuel that is combined into a third conduit or continuing conduit (also referred to as a mixing chamber) which in turn conveys the mixture to the engine's intake manifold.

A further problem for which a solution had to be derived was the discovery that the process as described, when vaporizing the common gasolines that are commercially available, generates a liquid residual that does not readily vaporize, e.g., at the temperature setting considered otherwise optimal. Over a period of time, this liquid residual becomes a greater and greater portion of the liquid content of the

vaporization tank. Thus, a provision is made for a periodic purging of the liquid residual from the tank.

Whereas it was determined that the residual liquid burned acceptably well in conventional engines, and particularly to the extent that the systems of the preferred embodiment are adaptable and applied as retrofits to such conventional engines, a first solution is the alternate running of the engine, i.e., on vaporized fuel as described above, and then, as desired, converting back to conventional liquid fuel operation wherein the residual liquid is used to fuel the engine. A recycling procedure may be established to (a) fill the tank with e.g., a gallon of liquid gasoline; (b) vaporizing 80% of the fuel and then switching to conventional engine operation to burn off the liquid residual; and (c) refill the tank and switch back to vaporized fuel. Other solutions are certainly contemplated. The residual can be simply extracted from the tank on a periodic basis, stored until refueling is required, and then disposed of or preferably transferred for use in a conventional engine use. It is theorized that the residual can also be eliminated by periodic higher temperature vaporization which may vaporize the residual at some but acceptable loss of efficiency.

The invention will be more fully appreciated and understood by reference to the following detailed description and drawings referred to therein.

Description of the Figures

Fig. 1 is a schematic overview of a preferred embodiment of the invention;

Fig. 2 is an operational diagram of the system utilized for the embodiment of Fig. 1;

Fig. 3 is an exploded view of the vaporization tank of Fig. 1; and

Fig. 4 is a further exploded view illustrating in particular the control valves of the system of Figs. 1 and 2.

Description of the Preferred Embodiment

Reference is made to Fig. 1, which provides a schematic overview of the components of a system in accordance with the present invention. A gasoline-powered engine as labeled, includes an intake port 10 connected to the engine's throttle body. The engine, when operating, draws air and fuel through port 10. The engine includes an exhaust pipe 12 that is equipped with an 0^2 sensor 14. The engine, intake port 10 and 0^2 detector 14 may be standard equipment provided for a conventional gasoline-driven vehicle, and the remainder of the components of the illustrated embodiment are incorporated into the system to achieve the objectives of the present invention.

Item 16 represents an air box through which ambient air is drawn when operating the engine. Air conducting conduits 18 and 20 from air box 16 provide the desired airflow to the remainder of the system as will be described.

Conduit 20 includes a valve 22 that controls the volume of air directed through conduit 20 and which is conveyed to a vapor producing tank 26 via the tank's top or cover 24.

Conduit 18 includes a valve 28 which controls the volume of ambient air that is directed into a mixing chamber 30.

Returning to the vapor-producing tank 26, the tank is provided with flow control apparatus, e.g., baffles, which will be later explained, but for this overview description it will be understood that air from conduit 20 (as controlled by valve 22) enters the tank 26 through the top 24, liquid fuel 28 is drawn from a gas tank 32 via conduit 34, hot water heating coils immersed in the liquid fuel via inlets and outlets 36, 38 heat the gas/fuel 28 ~~and generate vapors~~ 40. The vapors are picked up by the airflow from air conduit 20 and directed out through conduit 42 to the mixing chamber 30 but controlled by valve 44. The air vapor mixture of conduit 42 is intermixed in mixing chamber 30 with ambient air from conduit 18, and the mixture is directed through the intake port 10 and from there into the combustion tank of the engine.

Reference is now also directed to Fig. 2 which illustrates an automatic control process for the air, vapor, and fuel flow rates referred to in Fig. 1. Each valve 22, 28 and 44 are opened and closed as desired (between any of the unlimited positions between fully opened and fully closed) by motors, e.g., stepper motors 22' 28' and 44'.

It has been determined that fuel efficiency can be measured by the hydrocarbons that are emitted from the vehicle exhaust. Unfortunately, the elimination of hydrocarbons from gasoline-produced engines currently available cannot be total as such produces an undesired and unpermitted emission of nitrogen oxides. Thus, one first determines the level of nitrogen oxide that is permitted and then the lowest level of hydrocarbons that will stay within the limits permitted for the restriction on nitrogen oxide.

It has further been determined that 0^2 detectors for detecting a level of 0^2 in the vehicle's exhaust and which have been incorporated into the exhaust system of later model vehicles, are directly related to the level of hydrocarbons in that same exhaust. Thus, one can determine what 0^2 reading of the detector 14 produces the optimum fuel efficiency. For example, a desired hydrocarbon level may be determined to exist when the 0^2 monitor produces a reading of 3 volts.

Returning to Fig. 1, it has been determined that fuel efficiency is achieved by controlling the ratio of fuel-to-air mixture achieved at the mixing chamber 30 from which the mixture enters the engine intake throttle body. It is known that the vapor-air-mixture directed into the mixing chamber 30 from conduit 42 is too rich, e.g., 1 part fuel to10 parts air, and of course the air only from conduit 18 has zero parts fuel. The desired mixture may be that which achieves a 30 to 1 ratio, e.g., of 2 cubic feet of air, through valve 28 for each cubic foot of air/vapor through valve 44.

Whereas the valves 28 and 44 can be set to achieve the desired mixture at a given point in time, it has been learned that many factors affect the ratio achieved in the vapor/fuel mixture flowing through conduit 42.

Assuming a specific hydrocarbon emission is desired, a reading of the 0^2 detector will verify that this desired mixture has been achieved, as that reading also indicates the hydrocarbons in the exhaust. As explained, a fixed setting will not likely achieve the optimum ratio over any given period of time. Any temperature change, any elevational change and even differences in fuel make up will skew the vapor/fuel mixture flowing from the tank 26 to the mixing chamber 30.

Accordingly, the valves 22, 28 and 44 are operated by stepper motors 22', 28' and 44' (illustrated in the flow chart of Fig. 2 and in exploded perspective view in Fig. 4) which stepper motors are automatically operated by computer C. Computer C monitors the 0^2 and thus the hydrocarbon emissions in exhaust 12 and should those readings indicate too high or too low hydrocarbons, the stepper motors are activated by the computer to change the relative fluid volumes from conduit 18 and conduit 42. Should the reading show a too high hydrocarbon level, the vapor/air flow of conduit 44 needs to be lessened, e.g., the valve 44 closed, or, e.g., the valve 28 opened, or, e.g., both closing of valve 44 and opening of valve 28.

The adjustment may take place in stages, i.e., a 1° closing of valve 44, a re-reading of the 0^2 detector followed by repeated partial closing of valve 44 or alternatively the partial opening of valve 18 or a combination of both. Valve 22 can also be a factor as restricting air flow into conduit 20 will slow the flow of air to the tank 26, thus to conduit 40, while also diverting more airflow through valve 28.

The structure as described enables the designer to design a system that will theoretically provide the desired result in fuel-to-air mixture (e.g., 1 to 30) as deemed desirable, but then in recognition of the impact of small environmental changes that produce substantial deviations in efficiency, provide automatic adjustments that are responsive to real time readouts from an exhaust monitor, e.g., an 0^2 detector.

Reference is now made to Fig. 3, which illustrates the components of the vaporizing tank 26. The tank 26 consists of a metal box 48 having dimensions of about 4" x 8" x 12". Fitted to the bottom of the tank is a hot water coil 50 that

includes an inlet 52 and outlet 54 which, when assembled to the box 48, extends from the box via inlet 52' and outlet 54'.

Seated onto the box bottom and over the coil 50 is a baffle grid 56. The plates of the baffle grid 56 include slots 58 which enable the seating of the grid over the coil 50. Baffle grid 56 includes fastener tabs 60 and assembled to the fastener tabs 60 is a lower baffle plate 62 having spaced circular opening 64. The baffle plate 62 is seated below the upper edge of box 48 (defined by flange 84) and affixed to the flange 84 is an upper baffle plate 66. Extending flanges 68 of baffle plate 66 protrude laterally from the box and provide the means to secure the box 48 to the body of the vehicle. Upper flange 68 has rectangular openings 70.

Secured to the upper baffle plate 66 and in alignment with an air inlet to be described is a secondary upper baffle plate 72, reduced in size and secured to the upper plate 66 so as to cover a substantial portion of the opening 70'. Provided in this secondary plate is a plurality of small holes, e.g., five holes 74 having a size of about a quarter inch in diameter. Baffle plate 72 provides an impediment to airflow from air inlet 78 and diverts the air flow laterally and downwardly within the tank 26.

Completing the assembly is the top or cover 24 which has a complex shape which can be described as a distorted pyramid shape. The apex of the pyramid shape is positioned at one end whereat an air inlet 78 is provided A vapor air outlet 80 is provided at the same end but along the side wall of the pyramid shape. A flange 82 forming the peripheral edge of the top 24 includes bolt holes which line up with bolt holes in flange portion 76 of baffle plate 66 and with bolt holes in a flange 84 forming the peripheral edge of box 48. Bolts (not shown) are inserted through the aligned bolt holes to fasten the components together. A float 86 contained in the box 48 determines the level of liquid gasoline contained in the box. The liquid gasoline enters the box through conduit 34 and a recycling conduit 90 is provided to drain and/or circulate the gasoline in the vaporizing tank 26 as may be desired.

In operation liquid gasoline is filled to a level of about ¾ inch in the bottom of the box 48 which is above the position of the heater coils 50 and below the top of the baffle grid 56. The baffle grid 56 and baffle plate 62 primarily prevent sloshing of the gasoline during driving of the vehicle. As the liquid gasoline vaporizes (induced by the heating coil 50) air from inlet 78 is dispersed across the liquid surface via baffle plates 72 and 68 which collects vapors 40 (see Fig. 1) and is then directed through outlet 80 and to the mixing chamber 30 via conduit 42 as previously discussed.

As gasoline is vaporized and drawn from the surface of the liquid gasoline, the gasoline level diminishes which is detected by the float 86. As determined desirable by the system, the gasoline is replenished through inlet 34. After some period of time, the gasoline starts to become contaminated (does not vaporize) and it is desirable to purge the tank. This can be done by converting the engine to gasoline use and drawing the residual gas of the tank 26 through the conventional gas injection system. It can also be simply drained into a holding tank and utilized for other power equipment, e.g., a powered law mower.

Whereas the above is considered a preferred embodiment, the reader will readily understand that numerous modifications and variations may be made without departing from the intended scope of the invention. Accordingly, the invention is not limited to the structures as described above but fully encompasses the definitions of the appended claims.

CLAIMS

What is claimed is:

1. A fuel supply assembly for a gasoline fueled engine including a combustion chamber for combusting fuel, and an exhaust for the combusted fuel, which assembly comprises:

a vaporizing tank, a quantity of liquid gasoline fuel contained in the tank, a heating source for heating the fuel, and a temperature control for controlling the temperature of the liquid gasoline fuel as contained in the tank;

said temperature control maintaining the temperature of the liquid gasoline fuel to produce vaporization of the fuel which rises from the surface of the liquid, a conduit arrangement conveying the vaporized gasoline fuel from the tank, a primary source of ambient air mixed with the vaporized gasoline fuel conveyed by said conduit arrangement and said conduit arrangement conveying the intermixed ambient air and vaporized fuel to the engine for combustion; and

an automatic control monitoring the engine exhaust and controlling the intermixing of the ambient air and vaporized gasoline fuel to maintain a desired hydrocarbon level in the exhaust.

2. A fuel supply assembly as defined in Claim 1 wherein a secondary source of the ambient air is directed into and through the tank for collecting and conveying an enriched vaporized air and fuel mixture into the conduit to be thereafter combined with the primary source of ambient air.

3. A fuel supply assembly as defined in Claim 2 wherein a valve is provided for one or both of the primary source of ambient air and enriched vaporized gasoline fuel and air mixture, said one or both valves controlling the intermixing of said primary ambient air and vaporized gasoline and air mixture.

4. A fuel supply assembly as defined in Claim 3 wherein said control comprises a sensor sensing combustion exhaust of said engine for determining the presence of

hydrocarbons in said exhaust, said valve responsive to said sensor for modifying said intermixing and to thereby maintain a desired content of hydrocarbons in said exhaust.

5. A fuel supply assembly as defined in Claim 4 wherein said sensor senses 0^2 emissions and said control determines the hydrocarbons based on the 0^2 emissions.

6. A fuel supply assembly as defined in Claim 2 wherein a baffle arrangement in the tank directs air from said secondary source over the surface of the liquid fuel for stabilizing the temperature of said air as the air collects and conveys the vaporized fuel.

7. A fuel supply assembly as defined in Claim 1 wherein said fuel source assembly is provided as an alternate fuel source to said engine.

8. A fuel supply assembly as defined in Claim 7 wherein the fuel as vaporized produces a residual fuel portion and a control for selectively providing vaporized fuel or a liquid fuel to the combustion chamber, said residual fuel conveyed to said combustion chamber as liquid fuel.

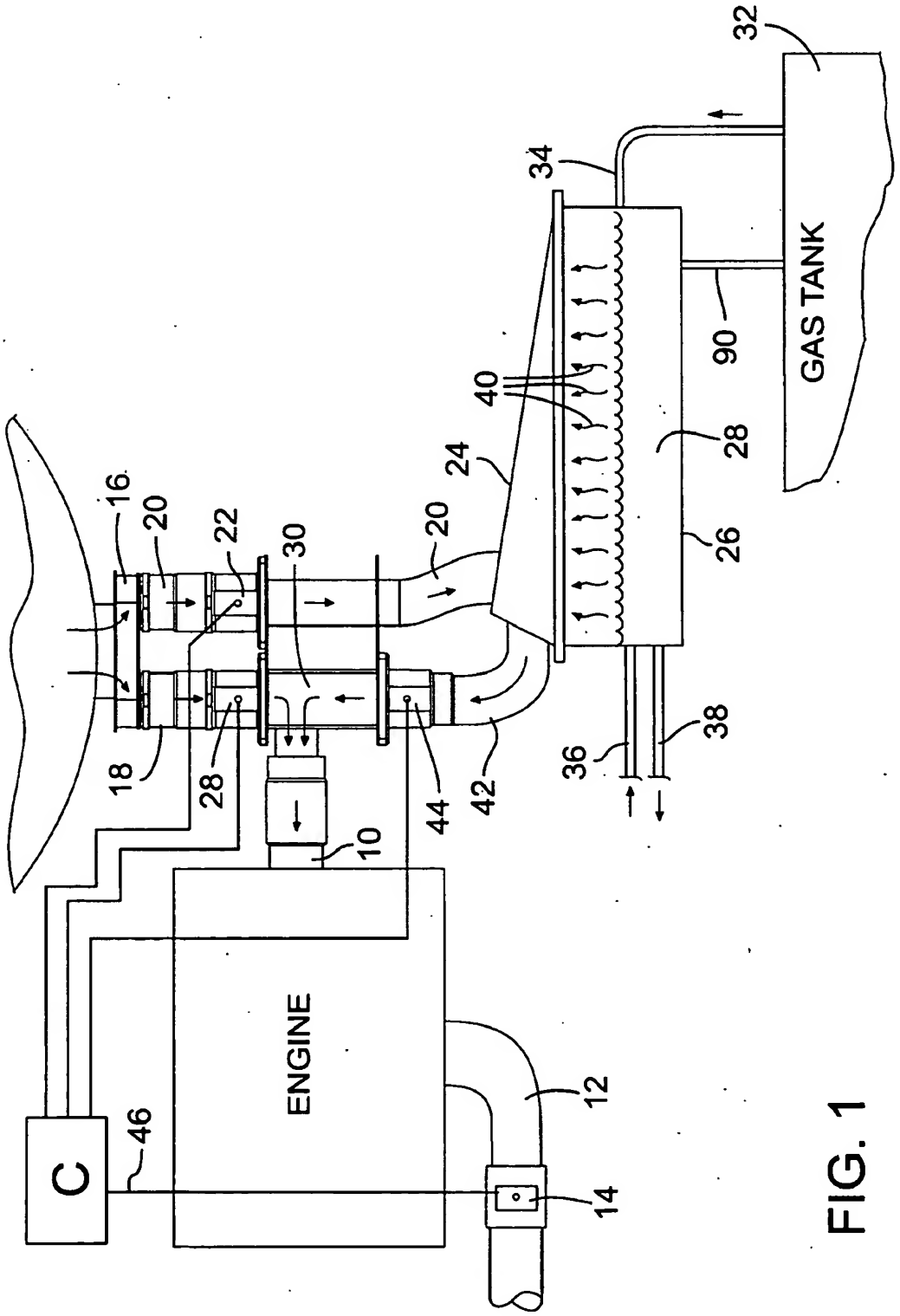

32
34
GAS TANK
90
40
28
24
26
16
20
22
30
20
18
28
44
42
36
38
10
ENGINE
12
C
46
14

FIG. 1

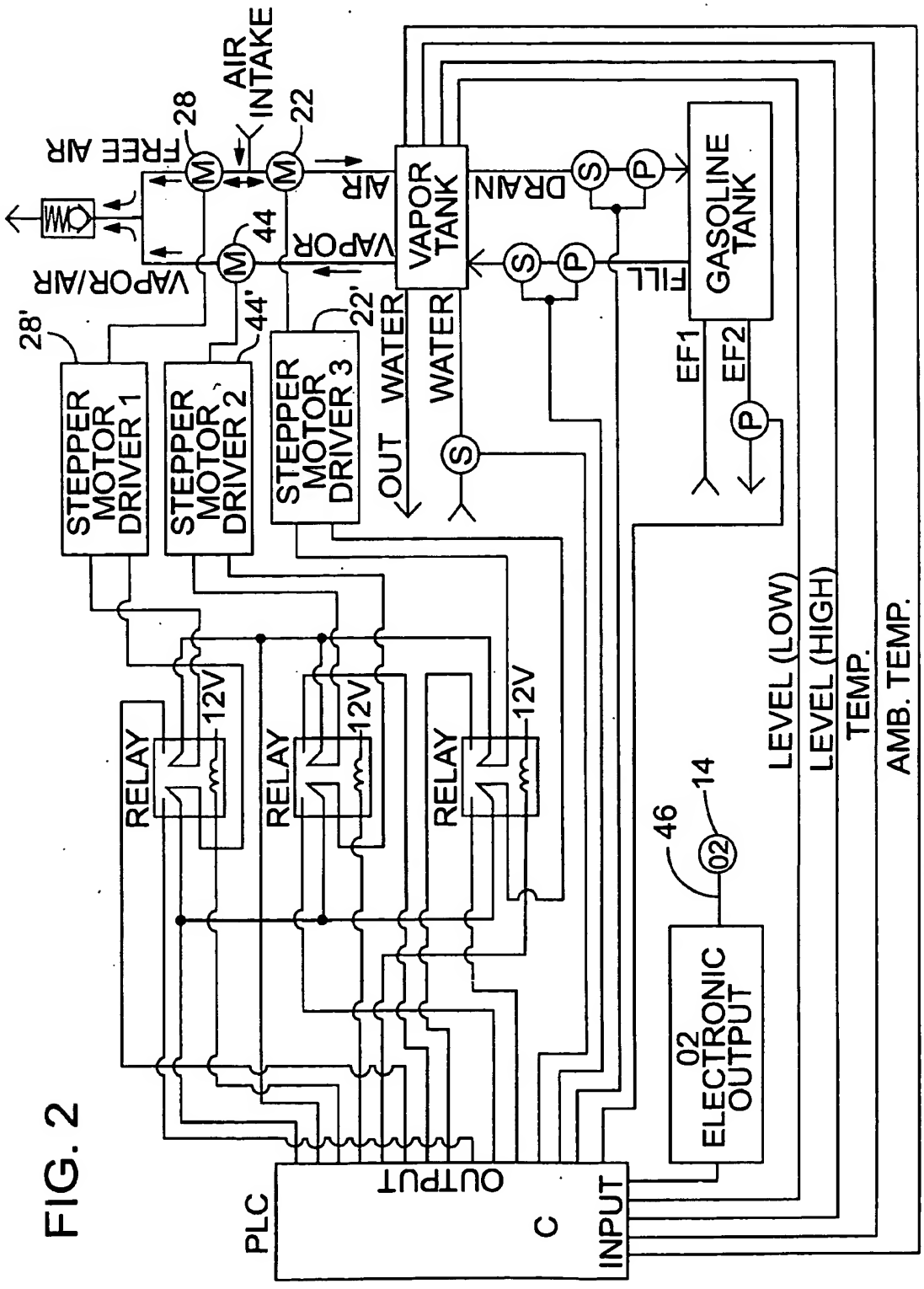
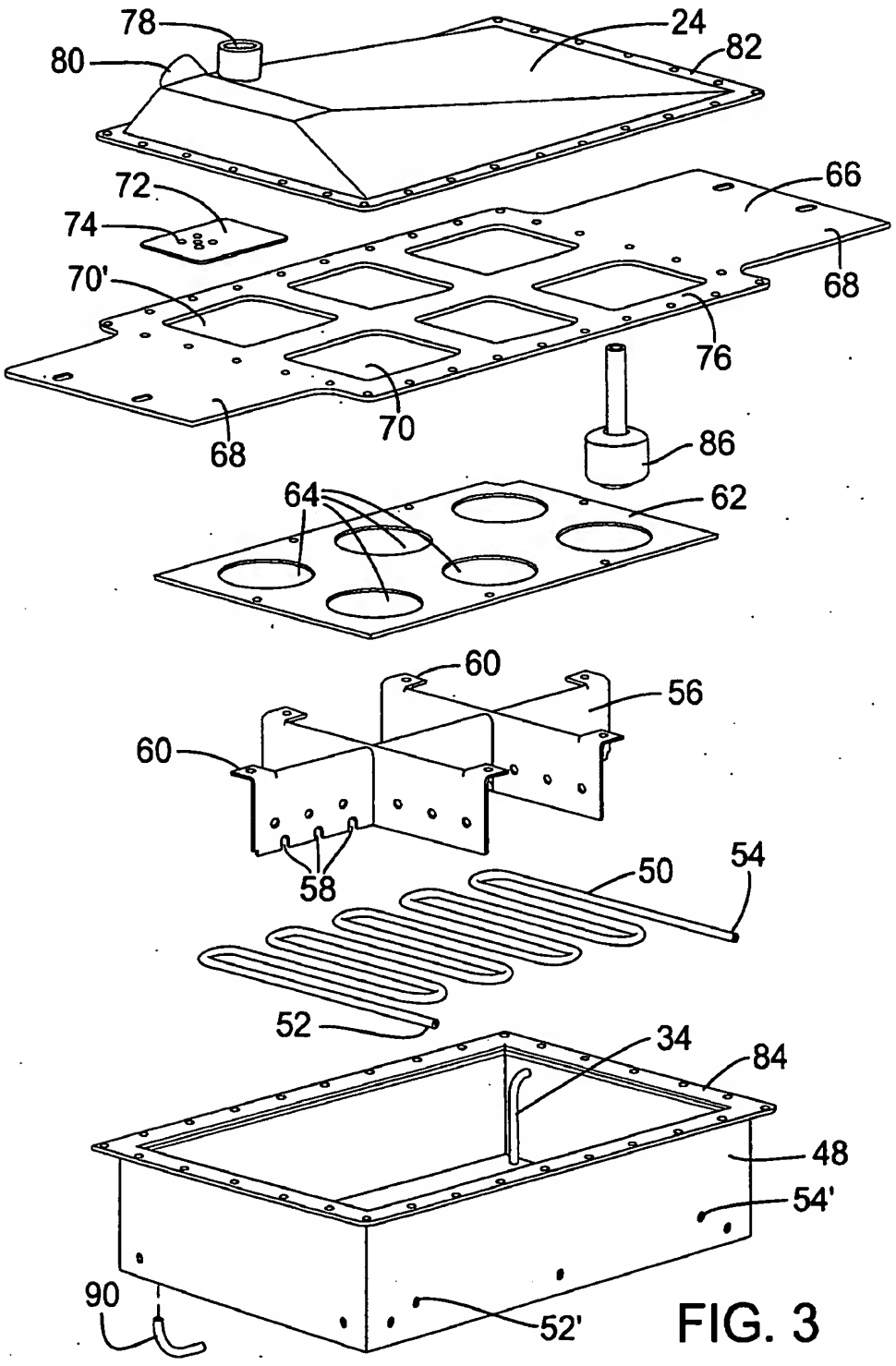

AIR INTAKE
28
22
FREE AIR
VAPOR/AIR
44
AIR
VAPOR
VAPOR TANK
DRAIN
FILL
GASOLINE TANK
28'
44'
22'
STEPPER MOTOR DRIVER 1
STEPPER MOTOR DRIVER 2
STEPPER MOTOR DRIVER 3
OUT WATER
WATER
EF1
EF2
RELAY
12V
LEVEL (LOW)
LEVEL (HIGH)
TEMP.
AMB. TEMP.
46
14
02
02 ELECTRONIC OUTPUT
PLC
OUTPUT
C
INPUT

FIG. 2


78
80
24
82
72
74
66
70'
68
76
68
70
86
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62
60
56
60
58
50
54
52
34
84
48
54'
90
52'

FIG. 3

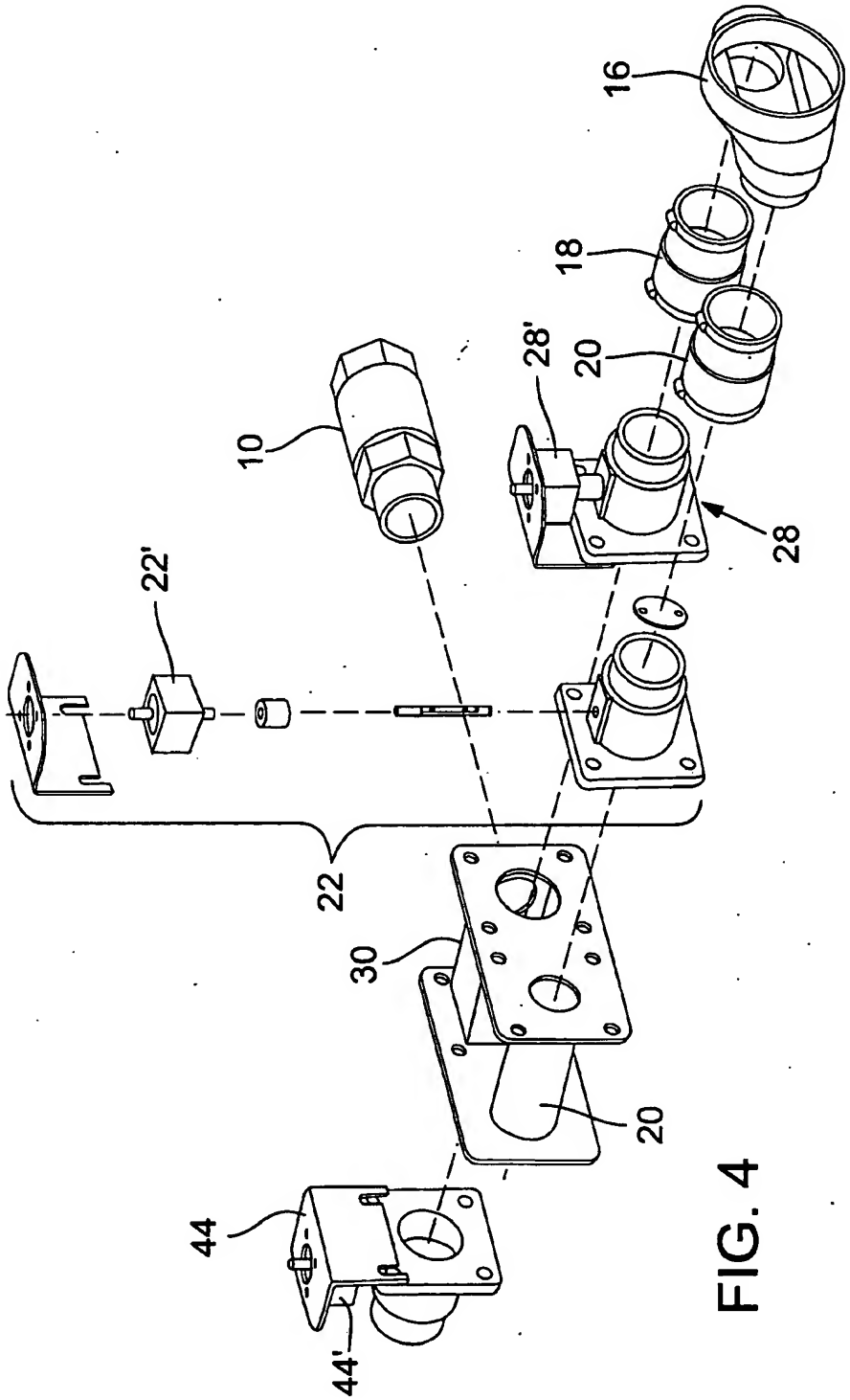

FIG. 4

COMBINED DECLARATION AND POWER OF ATTORNEY FOR A PATENT APPLICATION

INVENTORSHIP IDENTIFICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

VAPOR FUELED ENGINE

SPECIFICATION IDENTIFICATION

the specification of which

__√__ is attached hereto.
_____ was filed on _____ as
United States Application _____
or PCT International Application Number _____
and was amended on _____.
(if applicable)

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

PRIORITY CLAIM (35 U.S.C. § 119(a)-(d))

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

(Application Number)	(Filing Date)
(Application Number)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)

POWER OF ATTORNEY

I hereby appoint the Practitioners at **Customer No. 000025943** as my patent attorney(s)/agent(s); with full power of substitution and revocation, to prosecute this application identified above, and to transact all business in the U.S. Patent and Trademark Office connected herewith.

Send all correspondence and direct telephone calls to: **Customer No. 000025943.**

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole/First Inventor: RAYMOND BRYCE BUSHNELL

Inventor's Signature: Raymond Bryce Bushnell **Date:** 10-11-03

Residence: Beavercreek, OR (City, State) **Citizenship:** USA (Country)

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Inventor's Signature: Danny Robert Lewis **Date:** 10-11-03

Residence: Beavercreek, OR (City, State) **Citizenship:** USA (Country)

Post Office Address: 25023 S. Beeson Road
Beavercreek, OR 97004

Full Name of Joint/Third Inventor: ROBERT WILLIAM PARRY

Inventor's Signature: Robert William Parry **Date:** 10-11-03

Residence: Oregon City, OR (City, State) **Citizenship:** USA (Country)

Post Office Address: 17212 S. McCubbin Road
Oregon City, OR 97045

Title 37, Code of Federal Regulations, Section 1.56
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a *prima facie* case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US04/014146

International filing date: 07 May 2004 (07.05.2004)

Document type: Certified copy of priority document

Document details: Country/Office: US
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Filing date: 11 November 2003 (11.11.2003)

Date of receipt at the International Bureau: 05 August 2004 (05.08.2004)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse